DOCUMENT RESUME

ED 223 996 CS 006 925

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TITLE The Influence of Children's Cognitive Styles on Reading Comprehension.
PUB DATE Feb 82
NOTE 11p.; Paper presented at the Annual Meeting of the Southwest Educational Research Association (Austin, TX, February 1982).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Style; Conceptual Tempo; Elementary Education; *Learning Modalities; *Learning Processes; *Reading Comprehension; Reading Difficulties; Reading Instruction; *Reading Research; Schemata (Cognition); Student Behavior; Student Needs

ABSTRACT

A study of 103 second, third, and fourth grade students investigated relationships among cognitive styles and reading comprehension. Each subject was individually tested using four different instruments to assess four cognitive styles: (1) field-independence/dependence (ability to locate a simple figure--concept--hidden in a complex field), (2) conceptual tempo (how one responds in situations of response uncertainty), (3) breadth of categorization (identifying maximum and minimum plausible answers to a variable), and (4) attentional style (attending to relevant stimuli while ignoring irrelevant stimuli). The dependent variable in the study was reading comprehension ability, as measured by a test developed by the Educational Testing Service. The results suggest that cognitive styles, especially field-independence, are in fact related to reading comprehension and that students who are relatively field-dependent, impulsive in responding, and distracted by irrelevant stimuli are most likely to have difficulty with reading comprehension as a result of learning styles. Teachers might employ style measures to help identify these high risk students, and may also try to help students modify styles, or help them use strategies that compensate for style-related difficulties. For example, impulsive students might be rewarded for reading all directions and all possible answers before responding to questions, and students with constricted control might be given a quiet area in which to work. (HTH)

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THE INFLUENCE OF CHILDREN'S COGNITIVE STYLES ON READING COMPRENSION

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Paper presented at the annual meeting of the Southwest Educational Research Association, Austin, February 12, 1982.

CS506925

Cognitive style has been defined as a person's habitual mode of thinking, perceiving, problem solving, and remembering. It is an unconscious mode of thought related to the general process of cognition (Schwen, Bednar & Hodson, 1979). While at least 19 different cognitive styles have been identified (Messick, 1976), few have been thoroughly investigated. However, since cognitive style and reading comprehension are both part of general cognitive processes, logic suggests that style and comprehension phenomena may be related. Indeed, it can be argued more specifically that at least four cognitive styles may be important in reading comprehension.

The construct of field-independence/field-dependence was originally delineated by Witkin (1949). The style exists both as a perceptual and as a psychological dimension of thought. Typical tests for this style measure the relative ability of a person to locate a simple figure hidden in a complex field. This perceptual "disembedding" skill is related to a person's analtyic thinking ability. Field-independent persons more easily perceive the target figure hidden within a picture or drawing. Theoretically, field-dependent persons have more trouble doing so because their thought processes are "global" rather than "analytical." The style's implication for reading comprehension is that the more analytical, field-independent person should comprehend better than the more global, field-dependent reader, because the field-independent person should be more able to deduce meaning. Recent research by Spiro and Tirre (1980) with college students lends credence to this hypothesis. The investigators found that field-independent readers tend to comprehend better because they use prior knowledge more effectively.

Conceptual tempo was identified as a style by Kagan, Rosman, Day, Albert, and Phillips (1964). The style is a measure of how persons respond in situations of response uncertainty. The typical tests of conceptual tempo require subjects to look at very similar pictures and then identify the ones which exactly match target pictures. Persons are considered either reflective, which means slow to respond but accurate, or impulsive, meaning quick to respond and inaccurate. Evidence (Egeland, 1974; Hall & Russell, 1974; Lesiak, 1970) suggests that the reflective reader is a better comprehender of discourse. The reflective student considers possible interpretations of text more carefully than does the student's more impulsive counterpart.

Breadth of categorization (Pettigrew, 1958) is assessed by asking subjects to identify what they believe to be the minumum and the maximum plausible values for variables. An example question might be: "The average adult Pygmy is 3.2' tall. How tall do you think the shortest living adult Pygmy is? How tall do you think the tallest living adult Pygmy is?" Some subjects tend uniformly to pick relatively extreme answers; these individuals are considered to be broad categorizers and are thought habitually to make more abstract and creative groupings than do narrow categorizers. In this vein, Andersson (1981) found that more creative students have better inferential comprehension skills, presumably because they are better able to create abstract meaning.

Finally, attentional style (Denney, 1974; Klein, 1954) is a measure of the degree to which a person attends to relevant stimuli while ignoring extraneous stimuli. Subjects who are easily distracted are said to have constricted control, while those who are more able to ignore irrelevant stimuli are said to

have flexible control. Logic suggests that students exhibiting flexible control of attention should be better comprehenders since they can more easily choose to "read for meaning" while readers with more constricted control may be distracted by passage features which are less essential to developing comprehension.

Thus, logic and some empirical evidence suggests that these four cognitive styles may be related to reading comprehension. However, these relationships have not been extensively explored with elementary school age children. For example, Spiro and Tirre's (1980) research, though important and informative, was conducted with college-age readers. Furthermore, very few studies have explored the combined effects of these cognitive styles; most studies have simply investigated the influence of a single style on reading comprehension. Such an approach does not lead to insights regarding the interactive effects of cognitive styles on comprehension.

This study was conducted to investigate relationships among the styles and the reading comprehension of children. Specifically, the study addressed two research questions. First, to what extent, if any, are the styles related to the reading abilities of children? Second, to what extent do the styles interact in their influence on comprehension?

Method

The subjects in the study were 103 second, third, and fourth grade students enrolled in elementary school in a metropolitan area located in the Southwestern United States. Each child was individually tested using four different instruments: 1) the Children's Embedded Figures Test (CEFT) developed by

Witkin, Oltman, Raskin, and Karp (1971); 2) the Matching Familiar Figures Test (MFFT), a measure conceptual tempo (Kagan, 1965); 3) a breadth of categorization test (Pettigrew, 1958), and 4) a Fruit Distraction Test, based on a similar test described in the literaure (Santostefano & Paley, 1964). Although individual testing of the subjects was very time consuming, it was deemed necessary to protect the integrity of the study's results. The dependent variable in the study was reading comprehension ability, as measured by a test developed by Educational Testing Services (1976).

Results

The data were analyzed by performing a multiple regression analysis. The multiple correlation between the reading comprehension variable and the several predictor variables was .57. This value is statistically significant ($F = 9.23$, $df = 5,97$, $p < .01$). The bivariate correlations among the variables and the beta weights for the predictor variables are both presented in Table 1.

INSERT TABLE 1 ABOUT HERE.

Discussion

The multiple correlation ($R = .57$) between reading comprehension and the styles as a set was statistically significant. Furthermore, the first column of Table 1 indicates that the bivariate correlations between the styles and comprehension were all statistically significant ($p < .01$), with the exception of the correlation between attentional style and comprehension. An examination of the first and last columns of Table 1 indicates that the predictor variables which were most strongly related to comprehension were, respectively,

field-independence, the error dimension of reflective-impulsive, and breadth of categorization. The tabled results also suggest that some of the style variables are correlated with each other, and thus do interact in their relationship with comprehension.

These results suggest that the cognitive styles, especially field-independence, are related to reading comprehension. This result is consistent with the limited previous research (e.g., Spiro & Tirre, 1980) in this area. Thus the study naturally raises the issue of what implications the results have for classroom practice. Although there are some dangers in viewing the results as demonstrating causality (Thompson, 1981, p. 3), some suggestions can still be tentatively offered.

First, teachers can employ style measures to help identify students who are likely to have difficulty with reading comprehension partly as a function of their cognitive styles. The study's results suggest that students who are relatively field-dependent, impulsive, and have constricted control, are most likely to fall into the "high risk" category. Thompson and Pitts (1981) have developed an instrument which might be used by teachers for just such purposes.

Teachers may also try to help students modify styles, or help students use strategies which compensate for style-related difficulties. For example, impulsive students might be rewarded for reading all directions and all possible answers before responding to questions. Or the student with constricted control might be given a quiet area in which to work.

Finally, cognitive style measures could be used to encourage students to monitor their own thought processes. Brown (1980) defines "metacognition" as conscious control of one's own cognitive actions, and suggests that metacognition is very important in the reading comprehension process. Once children begin to analyze their own thinking they have the opportunity to modify their cognitive processes. This can be an exciting process for students and teachers alike, and may have important benefits for reading comprehension.

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Table 1

Correlation Coefficients and Beta Weights

Variable	Style	Reading	Predictors FI	RI1	BC	AS	Beta Weights
Children's Embedded Figures	(FI)	.53**					.430
Error Score for Impulsivity	(RI1)	-.33**	-.31**				-.136
Breadth of Categorization	(BC)	-.31**	-.34**	.27**			-.117
Constricted Attention	(AS)	.15	.17*	-.11	-.16		.040
Latency Score for Impulsive	(RI2)	.25**	.24**	-.69**	-.14	.10	.032

* $p < .05$

** $p < .01$